Tile Coloring and Compositing

A tile is set to have either a constant color (for the whole tile), or takes each pixel value from an input image. Both of these cases may also have feedback from a texturing stage to scale the opacity (similar to thinning paint).

The steps for the 4 cases can be summarised as:

- Sub-pixel translate the tile's opacity values,
- Optionally scale the tile's opacity (if feedback from texture application is enabled).
- Determine the color of the pixel (constant or from an image map).
- Composite the pixel onto the background image.

Each of the 4 cases is treated separately, in order to minimize the time taken to perform the function. The summary of time per color compositing style for a single color channel is described in the following table:

Tiling color style	**No feedback from texture (cycles per pixel)**	**Feedback from texture (cycles per pixel)**
Tile has constant color per pixel	1	2
Tile has per pixel color from input image	1.25	2

Constant color

In this case, the tile has a constant color, determined by software. While the ACP 31 is placing down one tile, the software can be determining the placement and coloring of the next tile.

The color of the tile can be determined by bi-linear interpolation into a scaled version of the image being tiled. The scaled version of the image can be created and stored in place of the image pyramid, and needs only to be performed once per entire tile operation. If the tile size is 128 x 128, then the image can be scaled down by 128:1 in each dimension.

Without feedback

When there is no feedback from the texturing of a tile, the tile is simply placed at the specified coordinates. The tile color is used for each pixel's color, and the opacity for the composite comes from the tile's sub-pixel translated opacity channel. In this case color channels and the texture channel can be processed completely independently between tiling passes.

The overview of the process is illustrated in Fig. 103. Sub-pixel translation 410 of a tile can be accomplished using 2 Multiply ALUs and 2 Adder ALUs in an average time of 1 cycle per output pixel. The output from